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L7	2	6 and tree.TI.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2004/09/23 16:02
L8	23931	tree.ti.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2004/09/23 16:02
L9	16718	8 and @ad<"20011005"	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2004/09/23 16:16
L10	1281	9 and computer	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2004/09/23 16:03

L11	1	10 and mean and "standard deviation" and likelihood	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2004/09/23 16:05
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L13	2	"6748356"	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2004/09/23 16:14
L14	290	tree and distance and regulation and decision	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2004/09/23 16:15
L15	156	14 and @ad<"20011005"	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2004/09/23 16:17
L16	99	15 and mean	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2004/09/23 16:17
L17	29	16 and likelihood	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2004/09/23 16:17
S1	7	"5727130"	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2004/09/02 15:46

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L3	23	decision and tree and train and statistics and regulation and distance and mean	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2004/09/23 16:00
L4	10	3 and @ad<"20011005"	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2004/09/23 16:00
L5	523	decision and tree and train and statistics	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2004/09/23 16:00
L6	301	5 and @ad<"20011005"	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2004/09/23 16:02
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L8	23931	tree.ti.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2004/09/23 16:02
L9	16718	8 and @ad<"20011005"	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2004/09/23 16:03
L10	1281	9 and computer	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2004/09/23 16:03

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1 Fast detection of communication patterns in distributed executions
Thomas Kunz, Michiel F. H. Seuren
November 1997 **Proceedings of the 1997 conference of the Centre for Advanced Studies on Collaborative research**
Full text available: 📄 pdf(4.21 MB)   Additional Information: full citation, abstract, references, index terms

Understanding distributed applications is a tedious and difficult task. Visualizations based on process-time diagrams are often used to obtain a better understanding of the execution of the application. The visualization tool we use is Poet, an event tracer developed at the University of Waterloo. However, these diagrams are often very complex and do not provide the user with the desired overview of the application. In our experience, such tools display repeated occurrences of non-trivial commun ...

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1 Data clustering: a review   ▪
A. K. Jain, M. N. Murty, P. J. Flynn
September 1999 **ACM Computing Surveys (CSUR)**, Volume 31 Issue 3

Full text available: ▥ pdf(636.24 KB)   Additional Information: full citation, abstract, references, citings, index terms, review

Clustering is the unsupervised classification of patterns (observations, data items, or feature vectors) into groups (clusters). The clustering problem has been addressed in many contexts and by researchers in many disciplines; this reflects its broad appeal and usefulness as one of the steps in exploratory data analysis. However, clustering is a difficult problem combinatorially, and differences in assumptions and contexts in different communities has made the transfer of useful generic co ...

Keywords: cluster analysis, clustering applications, exploratory data analysis, incremental clustering, similarity indices, unsupervised learning

2 On randomization in sequential and distributed algorithms   ▪
Rajiv Gupta, Scott A. Smolka, Shaji Bhaskar
March 1994 **ACM Computing Surveys (CSUR)**, Volume 26 Issue 1

Full text available: ▥ pdf(8.01 MB)   Additional Information: full citation, abstract, references, citings, index terms

Probabilistic, or randomized, algorithms are fast becoming as commonplace as conventional deterministic algorithms. This survey presents five techniques that have been widely used in the design of randomized algorithms. These techniques are illustrated using 12 randomized algorithms—both sequential and distributed— that span a wide range of applications, including:primality testing (a classical problem in number theory), interactive probabilistic proof s ...

Keywords: Byzantine agreement, CSP, analysis of algorithms, computational complexity, dining philosophers problem, distributed algorithms, graph isomorphism, hashing, interactive probabilistic proof systems, leader election, message routing, nearest-neighbors problem, perfect hashing, primality testing, probabilistic techniques, randomized or probabilistic algorithms, randomized quicksort, sequential algorithms, transitive tournaments, universal hashing

3 Computer-based systems for cooperative work and group decision making   ▪
Kenneth L. Kraemer, John Leslie King
July 1988 **ACM Computing Surveys (CSUR)**, Volume 20 Issue 2

Additional Information:

Full text available: 🔁 pdf(3.56 MB)   full citation, abstract, references, citings, index terms

Application of computer and communications technology to cooperative work and group decision making has grown out of three traditions: computer-based communications, computer:based information service provision, and computer-based decision support. This paper reviews the group decision support systems (GDSSs) that have been configured to meet the needs of groups at work, and evaluates the experience to date with such systems. Progress with GDSSs has proved to be slower than originally antic ...

4 Efficient algorithms for geometric optimization

Pankaj K. Agarwal, Micha Sharir
December 1998 **ACM Computing Surveys (CSUR)**, Volume 30 Issue 4

Full text available: 🔁 pdf(577.74 KB)   Additional Information: full citation, abstract, references, citings, index terms

We review the recent progress in the design of efficient algorithms for various problems in geometric optimization. We present several techniques used to attack these problems, such as parametric searching, geometric alternatives to parametric searching, prune-and-search techniques for linear programming and related problems, and LP-type problems and their efficient solution. We then describe a wide range of applications of these and other techniques to numerous problems in geometric optim ...

Keywords: clustering, collision detection, linear programming, matrix searching, parametric searching, proximity problems, prune-and-search, randomized algorithms

5 Three-dimensional medical imaging: algorithms and computer systems

M. R. Stytz, G. Frieder, O. Frieder
December 1991 **ACM Computing Surveys (CSUR)**, Volume 23 Issue 4

Full text available: 🔁 pdf(7.38 MB)   Additional Information: full citation, references, citings, index terms, review

Keywords: Computer graphics, medical imaging, surface rendering, three-dimensional imaging, volume rendering

6 Symbolic Boolean manipulation with ordered binary-decision diagrams

Randal E. Bryant
September 1992 **ACM Computing Surveys (CSUR)**, Volume 24 Issue 3

Full text available: 🔁 pdf(2.12 MB)   Additional Information: full citation, abstract, references, citings, index terms

Ordered Binary-Decision Diagrams (OBDDs) represent Boolean functions as directed acyclic graphs. They form a canonical representation, making testing of functional properties such as satisfiability and equivalence straightforward. A number of operations on Boolean functions can be implemented as graph algorithms on OBDD data structures. Using OBDDs, a wide variety of problems can be solved through symbolic analysis. First, the possible variations in system parameters and op ...

Keywords: Boolean algebra, Boolean functions, binary-decision diagrams, branching programs, symbolic analysis, symbolic manipulation

7 Time-space trade-off lower bounds for randomized computation of decision problems

Paul Beame, Michael Saks, Xiaodong Sun, Erik Vee
March 2003 **Journal of the ACM (JACM)**, Volume 50 Issue 2

Full text available: 🔁 pdf(438.95 KB)   Additional Information: full citation, abstract, references, index terms

We prove the first time-space lower bound trade-offs for randomized computation of

decision problems. The bounds hold even in the case that the computation is allowed to have arbitrary probability of error on a small fraction of inputs. Our techniques are extension of those used by Ajtai and by Beame, Jayram, and Saks that applied to deterministic branching programs. Our results also give a quantitative improvement over the previous results.Previous time-space trade-off results for decision prob ...

Keywords: Branching programs, element distinctness, quadratic forms, random-access machines

8 Computer Interconnection Structures: Taxonomy, Characteristics, and Examples
George A. Anderson, E. Douglas Jensen
December 1975 **ACM Computing Surveys (CSUR)**, Volume 7 Issue 4

Full text available: pdf(1.42 MB)   Additional Information: full citation, references, citings, index terms

9 Model-based recognition in robot vision
Roland T. Chin, Charles R. Dyer
March 1986 **ACM Computing Surveys (CSUR)**, Volume 18 Issue 1

Full text available: pdf(4.94 MB)   Additional Information: full citation, abstract, references, citings, index terms, review

This paper presents a comparative study and survey of model-based object-recognition algorithms for robot vision. The goal of these algorithms is to recognize the identity, position, and orientation of randomly oriented industrial parts. In one form this is commonly referred to as the "bin-picking" problem, in which the parts to be recognized are presented in a jumbled bin. The paper is organized according to 2-D, 2½-D, and 3-D object representations, which are used as the basis for ...

10 Searching in metric spaces
Edgar Chávez, Gonzalo Navarro, Ricardo Baeza-Yates, José Luis Marroquín
September 2001 **ACM Computing Surveys (CSUR)**, Volume 33 Issue 3

Full text available: pdf(916.04 KB)   Additional Information: full citation, abstract, references, citings, index terms

The problem of searching the elements of a set that are close to a given query element under some similarity criterion has a vast number of applications in many branches of computer science, from pattern recognition to textual and multimedia information retrieval. We are interested in the rather general case where the similarity criterion defines a metric space, instead of the more restricted case of a vector space. Many solutions have been proposed in different areas, in many cases without cros ...

Keywords: Curse of dimensionality, nearest neighbors, similarity searching, vector spaces

11 Distance browsing in spatial databases
Gísli R. Hjaltason, Hanan Samet
June 1999 **ACM Transactions on Database Systems (TODS)**, Volume 24 Issue 2

Full text available: pdf(460.81 KB)   Additional Information: full citation, abstract, references, citings, index terms

We compare two different techniques for browsing through a collection of spatial objects stored in an R-tree spatial data structure on the basis of their distances from an arbitrary spatial query object. The conventional approach is one that makes use of a k-nearest neighbor algorithm where k is known prior to the invocation of the algorithm. Thus if m < k neighbors are needed, the k-nearest neighbor alg ...

Keywords: R-trees, distance browsing, hiearchical spatial data structures, nearest neighbors, ranking

12 Information Bounds Are Weak in the Shortest Distance Problem
Ronald L. Graham, Andrew C. Yao, F. Frances Yao
July 1980 **Journal of the ACM (JACM)**, Volume 27 Issue 3

Full text available: pdf(948.22 KB)   Additional Information: full citation, references, citings, index terms

13 Curriculum 68: Recommendations for academic programs in computer science: a report of the ACM curriculum committee on computer science
William F. Atchison, Samuel D. Conte, John W. Hamblen, Thomas E. Hull, Thomas A. Keenan, William B. Kehl, Edward J. McCluskey, Silvio O. Navarro, Werner C. Rheinboldt, Earl J. Schweppe, William Viavant, David M. Young
March 1968 **Communications of the ACM**, Volume 11 Issue 3

Full text available: pdf(6.63 MB)   Additional Information: full citation, references, citings

Keywords: computer science academic programs, computer science bibliographies, computer science courses, computer science curriculum, computer science education, computer science graduate programs, computer science undergraduate programs

14 Software reuse
Charles W. Krueger
June 1992 **ACM Computing Surveys (CSUR)**, Volume 24 Issue 2

Full text available: pdf(4.96 MB)   Additional Information: full citation, abstract, references, citings, index terms

Software reuse is the process of creating software systems from existing software rather than building software systems from scratch. This simple yet powerful vision was introduced in 1968. Software reuse has, however, failed to become a standard software engineering practice. In an attempt to understand why, researchers have renewed their interest in software reuse and in the obstacles to implementing it. This paper surveys the different approaches to software reuse found in the ...

Keywords: abstraction, cognitive distance, software reuse

15 Gross motion planning—a survey
Yong K. Hwang, Narendra Ahuja
September 1992 **ACM Computing Surveys (CSUR)**, Volume 24 Issue 3

Full text available: pdf(6.40 MB)   Additional Information: full citation, abstract, references, citings, index terms, review

Motion planning is one of the most important areas of robotics research. The complexity of the motion-planning problem has hindered the development of practical algorithms. This paper surveys the work on gross-motion planning, including motion planners for point robots, rigid robots, and manipulators in stationary, time-varying, constrained, and movable-object environments. The general issues in motion planning are explained. Recent approaches and their performances are briefly described, a ...

Keywords: collision detection, computational geometry, implementation, motion planning, obstacle avoidance, path planning, spatial representation

16 Tree-based group key agreement
Yongdae Kim, Adrian Perrig, Gene Tsudik

February 2004 **ACM Transactions on Information and System Security (TISSEC)**, Volume 7 Issue 1

Full text available: pdf(573.70 KB)   Additional Information: full citation, abstract, references, index terms

Secure and reliable group communication is an active area of research. Its popularity is fueled by the growing importance of group-oriented and collaborative applications. The central research challenge is secure and efficient group key management. While centralized methods are often appropriate for key distribution in large multicast-style groups, many collaborative group settings require distributed key agreement techniques. This work investigates a novel group key agreement approach which ble ...

Keywords: communication complexity, cryptographic protocols, group communication, group key agreement, security

17 Probabilistic checking of proofs: a new characterization of NP

Sanjeev Arora, Shmuel Safra
January 1998 **Journal of the ACM (JACM)**, Volume 45 Issue 1

Full text available: pdf(355.47 KB)   Additional Information: full citation, abstract, references, citings, index terms

We give a new characterization of NP: the class NP contains exactly those languages L for which membership proofs (a proof that an input x is in L) can be verified probabilistically in polynomial time using logarithmic number of random bits and by reading sublogarithmic number of bits from the proof.We discuss implications of this characterization; specifically, we show that approximating Clique ...

Keywords: NP-completeness, approximation algorithms, complexity hierarchies, computations on polynomials and finite fields, error-correcting codes, hardness of approximations, interactive computation, probabilistic computation, proof checking, reducibility and completeness, trade-offs/relations among complexity measures

18 Combinational logic synthesis for LUT based field programmable gate arrays

Jason Cong, Yuzheng Ding
April 1996 **ACM Transactions on Design Automation of Electronic Systems (TODAES)**, Volume 1 Issue 2

Full text available: pdf(628.91 KB)   Additional Information: full citation, abstract, references, citings, index terms, review

The increasing popularity of the field programmable gate-array (FPGA) technology has generated a great deal of interest in the algorithmic study and tool development for FPGA-specific design automation problems. The most widely used FPGAs are LUT based FPGAs, in which the basic logic element is a K-input one-output lookup-table (LUT) that can implement any Boolean function of up to K variables. This unique feature of the LUT has brought new challenges to lo ...

Keywords: FPGA, area minimization, computer-aided design of VLSI, decomposition, delay minimization, delay modeling, logic optimization, power minimization, programmable logic, routing, simplification, synthesis, system design, technology mapping

19 A survey of adaptive sorting algorithms

Vladmir Estivill-Castro, Derick Wood
December 1992 **ACM Computing Surveys (CSUR)**, Volume 24 Issue 4

Full text available: pdf(2.92 MB)   Additional Information: full citation, abstract, references, citings, index terms, review

The design and analysis of adaptive sorting algorithms has made important contributions to both theory and practice. The main contributions from the theoretical point of view are: the description of the complexity of a sorting algorithm not only in terms of the size of a problem instance but also in terms of the disorder of the given problem instance; the

establishment of new relationships among measures of disorder; the introduction of new sorting algorithms that take advantage of the exis ...

Keywords: adaptive sorting algorithms, comparison trees, measures of disorder, nearly sorted sequences, randomized algorithms

20 SIGSAM BULLETIN: Computer algebra in the life sciences

Michael P. Barnett

December 2002 **ACM SIGSAM Bulletin**, Volume 36 Issue 4

Full text available: pdf(240.15 KB)   Additional Information: full citation, abstract, references

This note (1) provides references to recent work that applies computer algebra (CA) to the life sciences, (2) cites literature that explains the biological background of each application, (3) states the mathematical methods that are used, (4) mentions the benefits of CA, and (5) suggests some topics for future work.

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